

SSMJ Southern Sudan Medical Journal

Volume 4. Number 2. May 2011

www.southernsudanmedicaljournal.com



Health priorities and the new dawn in South Sudan

Risk factors for the transmission of kala-azar

Treatment of uncomplicated *P falciparum* malaria

Trauma: death, disability and economic loss



SPECIAL SUPPLEMENT:

NURSING AND MIDWIFERY SERVICES IN SOUTH SUDAN



EDITORIAL

Health priorities and the new dawn in South Sudan *Dr Olivia Lomoro* 25

MAIN ARTICLES

Risk factors for the transmission of Kala-azar in Fangak, South Sudan *John Lagu Nyungura, Venny C.S Nyambati, Mugo Muiia and Eric Muchiri* 26

Malaria in South Sudan: 4. Treatment of uncomplicated *P. Falciparum* malaria *Robert Azairwe and Jane Achan* 30

Preventing malaria during pregnancy: factors determining the use of insecticide treated bednets and intermittent preventive therapy in Juba *Robert P. Napoleon, Amwayi S. Anyang, Jared Omolacan and Juliet R. Ongus* 33

Trauma, a new cause of death, disability and economic loss in Juba *Dario Kuron Lado*..... 36

REPORTS FROM SOUTH SUDAN

Snapshot of South Sudan around 2009 - How much have things changed? 39

A new link is born . . . between Winchester and Yei 40

Bor medical camp *Moses Gak Rech* 41

NEWS AND RESOURCES

SHORT ITEMS

Case study: intracranial haemorrhage. 38

Letter to the Editor 45

WHO CHART 6 FROM 'HOSPITAL CARE FOR CHILDREN'

..... 46

To receive a notice when new issues of the journal are on the website send an email to admin@southernsudanmedicaljournal.com

Cover photo by David Attwood

The Southern Sudan Medical Journal is a quarterly publication intended for Healthcare Professionals, both those working in the Southern Sudan and those in other parts of the world seeking information on health in the Southern Sudan. It aims to offer education and information in all specialities, and to identify research that will inform the development of Health Services in the Southern Sudan. We plan to include reports of original research, critical/systematic reviews, case reports, clinical photographic materials, letters to the Editor, use of drugs, medical news of public interest, and nutrition and public health issues.

The Journal is published in mid-February, May, August and November and is free online at:

www.southernsudanmedicaljournal.com

EDITORS

Dr Wani Mena

Department of Ophthalmology
Juba Teaching Hospital,
PO Box 88, Juba
Southern Sudan
wanimena@gmail.com

Dr Eluzai Abe Hakim

Department of Adult Medicine & Rehabilitation
St Mary's Hospital
Newport,
Isle of Wight PO30 5TG, UK
Eluzai_hakim@yahoo.co.uk

EDITORIAL BOARD

Dr James Ayrton

james.ayrton@gmail.com

Dr Charles Bakhiet

sakib@squ.edu.om

Dr Louis Danga

wedanga@hotmail.com

Professor James Gita Hakim

jhakim@mweb.co.zw

Dr Edward Eremugo Luka

opikiza@yahoo.com

Dr David Tibbutt

david@tibbutt.co.uk

Editorial Advisor

Ann Burgess

annpatriciaburgess@yahoo.co.uk

Editorial Assistant

Madeleine Linington

madeleine.linington@iow.nhs.uk

Reviewers are listed on the website

Health priorities and the new dawn in South Sudan

Dr Olivia Lomoro

Under Secretary
Ministry of Health
Government of
Southern Sudan
Juba

South Sudan has come out of a protracted long-standing civil war that has affected its health system and infrastructure. Following the Comprehensive Peace Agreement (CPA) in 2005, and the ending of the war, one of the major priorities of the Government remains the need for an entirely developmental approach in building up the health system and addressing the health needs of the population, especially women and children.

Surveys conducted in 2006 and 2010 across the country have reported grim epidemiological and health status indicators. Integral to these poor health indicators is the poor existing health infrastructure and system, shortage of basic health services, and shortage of qualified health personnel to provide quality health services and to train health care workers.

Whilst this lack of skilled personnel applies to all healthcare professions, it is particularly worse among Medical Doctors. The development of a doctor-led progressive health care service requires an active and well-funded Postgraduate Medical Training programme. At present this does not exist at all levels of the health care system, and there are limited trained specialised doctors to provide this programme.

It is for this reason that the Ministry of Health is planning a structured and sustainable Postgraduate Medical Training programme with the assistance of several stakeholders. These include renowned medical institutions such as the St Mary's Hospital, Isle of Wight-Juba Teaching Hospital Link, Poole Hospital-Wau Teaching Hospital Link, and Massachusetts General Hospital with South Sudan links. Although the planned programme is primarily hospital based, it will also support the development of Mid-level Training programmes. Already the St Mary's-Juba Hospitals link has, together with other partners, assisted technically in the establishment of the Juba College of Nursing and Midwifery and this will be replicated in Wau and Malakal. It is expected that over the next 4-5 years, the St Mary's Link Programme will support the training of at least 52 medical specialists within the 15 main medical specialities, so that they can lead local structured training programmes.

Furthermore, the Ministry of Health is establishing a 'Medical and Dentists Council' and a 'Nursing, Midwifery and Clinical Officers Council' to regulate professional conduct and ensure the safety of the public. There is need for a thorough refurbishment of the existing approaches to the establishment and re-organization of the health services infrastructure.

In conclusion, I reiterate that the current health situation in South Sudan is very challenging. However, the Ministry of Health, with the support of Developmental Partners and Friends of South Sudan and with the hope of an increased budget, plans to expand and improve the quality of existing Health Care services and so achieve the Ministry's vision of "A healthy and productive population, fully exercising their human potential"

References:

- Basic Package for Hospital Care Services, Government of Southern Sudan, Ministry of Health, 2010
- Sudan Household Health Survey, SSHS 2006
- Sudan Household Health Survey, SSHS 2010

On July 9th the name of this journal will change to 'South Sudan Medical Journal'.

SSMJ is now listed in the African Index Medicus - see <http://indexmedicus.afro.who.int/> under African Medical Journals.

Risk factors for the transmission of kala-azar in Fangak, South Sudan

John Lagu Nyungura^a, Venny C.S Nyambati^b, Mugo Muita^c and Eric Muchiri^d

Abstract

This article reports a case controlled study of kala-azar done in Fangak County in 2007. Fifty-six percent of the cases were under 5 years old. Most patients came for treatment two months or more after the onset of symptoms.

Outdoor night-time activities and the use of “smoking” (non-insecticide treated) bed nets were associated with kala-azar infection whereas the use of bed nets during the rainy season decreased the risk of infection.

It is recommended that there should be a greater distribution of treated bed nets and more kala-azar treatment centres in the county.

Note: This article reports the results of a study into some risk factors for the transmission of kala-azar in Fangak in 2007. There was another recent outbreak in this area on 2010 (1, 2). Recommendations were again made to distribute more treated bed nets and to open more kala-azar treatment centres. The official Ministry of Health guideline for the treatment of kala-azar is at the end of this article.

Introduction

Leishmaniasis are caused by 20 species of *Leishmania* (*L.*) and transmitted by 30 species of sandfly (3). The sandfly bites humans at night, primarily at twilight. Ninety percent of kala-azar/visceral leishmaniasis cases occur in Bangladesh, India, Nepal, Sudan and Brazil (4). Kala-azar is caused by *L. donovani* complex, which includes *L. donovani*, *L. infantum* and *L. chagasi*. It is characterised by:

- prolonged irregular fever
- lymphadenopathy
- hepato-splenomegaly and
- progressive anaemia (5).

The disease kills almost all untreated patients (6).

The endemic belt in the Sudan stretches from the Atbara River in the north-east to the Southern Sudan, Nuba Mountains and Darfur (7). *Phlebotomus orientalis* is the vector transmitting kala-azar in Sudan and is associated with black cotton soils and vegetations of *Acacia seyal* and *Balanites aegyptiaca* (8). However, in Kapoeta *P. martini* may be the vector (9).

Materials and methods

An unmatched case control study was carried out in Fangak County from October to December 2007. Questionnaires drafted in English were translated orally into the Nuer language. Exposure histories were taken retrospectively for the past year. This study was managed at the Coordinating Committee of the Organization for Voluntary Service (COSV) at a primary health care centre (PHCC).

The target population was kala-azar patients aged above two months old who had been living in Fangak County for at least two months and who presented for medical care. The sample size was calculated using statcalc in *Epi*

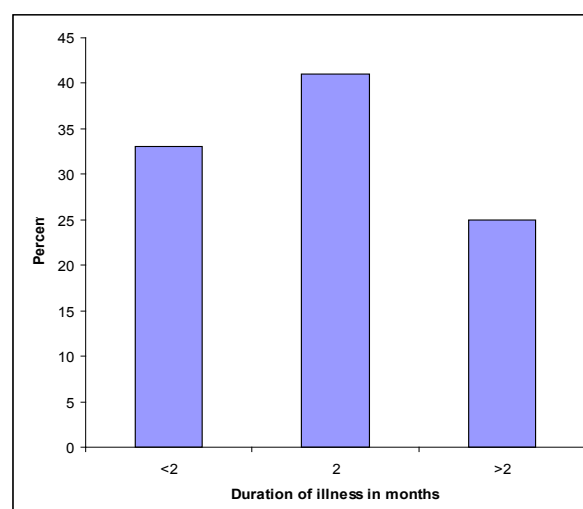


Figure 1. Distribution of patients by duration of illness before starting treatment

^a Ministry of Health, Government of Southern Sudan
jlagu2001@yahoo.com

^b Department of Biochemistry, Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya

^c Resident Advisor, Field Epidemiology and Laboratory Training Program, Southern Sudan

^d Field Epidemiology and Laboratory Training Program Nairobi, Kenya

Info 3.3.2 software. The following was employed: ratio of controls to cases, 2:1; power of 80%; confidence interval level of 95%. A sample size of 144 was obtained.

Two health facility controls that tested negative by dipstick were randomly selected for each case identified. Relatives of kala-azar patients were excluded as controls. Data were entered into the computer using Epi Info version 3.3.2 and kept confidential. Univariate, bivariate and unconditional logistic regression analyses were performed.

Results

There were 144 study recruits, 48 (33%) were cases and 96 (67%) were controls. Among the cases, 21 (44%) were males and 27 were females. Twenty-seven (56%) of all cases were under five years old (see Table 1) and 24 (89%) of these were under three years old.

Thirty-seven (77%) kala-azar patients presented for treatment at two months or more after the onset of symptoms (see Figure 1). Often traditional treatment is tried first. Figure 2 shows a child who has been treated with facial tattoos. Figure 3 is a child with kala-azar seen during the 2010 outbreak.

All cases of kala-azar had fever and enlarged lymph nodes (lymphadenopathy), 46% had an enlarged spleen (splenomegaly) and 42% an enlarged liver (hepatomegaly). Table 2 shows the number of cases and controls sleeping under different types of bed nets. Only 4 cases and 2 controls did not use a bed net. 69% of both cases and controls used bed nets purchased by the family.

Table 3 shows that the use of the “Smoking” type of bed nets was statistically significantly associated with kala-azar infection, while consistent use of a bed net during the rainy season (May to October 2007) was protective against kala-azar.

Note: The “Dhamoria” and the “Smoking” are types of non-insecticide treated bed nets. “Smoking” bed nets are made of green silky fibre in Khartoum. “Smoking” clothes are a favourite garment for Sudanese women who cover themselves with smoking from head to toes. People in Fangak prefer this type of bed net because it gives privacy outside during the hot season (see Figure 4)

Of the environmental factors analysed in Table 4, outdoor night activities were associated with kala-azar infection ($p = 0.02$). There was a “tendency towards significance”/borderline association when anthills ($p = 0.07$) and *B. aegypti* were near homes. When these factors were subjected to multiple logistic regression analysis, only outdoor night activities retained statistical significance ($p = 0.01$) (see Table 5).

Table 1. Distribution of cases and controls by age

	Cases: n (%)	Controls: n (%)
Total	48	96
Age in years		
0 - 5	27 (56)	60 (63)
5 - 10	10 (21)	8 (8)
10 - 15	2 (4)	4 (4)
15 - 20	3 (6)	4 (4)
20 - 25	3 (6)	4 (4)
>25	3 (6)	16 (17)
Age range	9 mo-45 yrs	5 mo-62 yrs



Figure 2. Attempt to treat kala-azar using traditional treatment (facial tattoos).

Table 2. Bed net use by cases and controls

	Cases: n (%)	Controls: n (%)
Types of bednets use		
Uses no bed net	4 (8)	2 (2)
Family purchased bed net	33 (69)	66 (69)
Types of bed nets		
“Polyethylene” ITNs	0 (0)	24 (25)
“Dhamoria” non ITNs	24 (50)	46 (48)
“Smoking” non ITNs	20 (42)	24 (25)
Total using any type of bed net	44 (92)	94 (98)

Table 3. Multiple logistic regression analysis for bed net use and the occurrence of kala-azar infection

Variable	OR	(95% C.I.)	P- value
Always uses bed net in rainy season	0.33	(0.15-0.72)	0.01
Uses "Smoking" type of bed nets	2.55	(1.14-5.71)	0.02



Figure 3. Patient with kala-azar seen during the 2010 outbreak at Fangar. He is visibly wasted and has an enlarged abdomen (splenomegaly).

Discussion

More than half of the participants affected by kala-azar were children aged less than five years. The greater susceptibility of the young children in the Fangak study could be due to malnutrition and an immature immune system. Lack of knowledge on kala-azar treatment by the family may have contributed to patients coming late for treatment.

This study indicated the following statistically significant associations:

- Engaging in night-time activities (e.g. dancing and games) increases the risk of kala-azar infection.
- A person is two and half times more likely to be at risk of getting kala-azar using a "Smoking" bed net than a treated bed net. The reason for this is not clear. However the "Smoking"

type of bed nets are made of light silk fibre so are easily blown away by the wind while the person is sleeping.

- The regular use of a bed net during the rainy seasons provides a degree of protection from kala-azar - a finding similar to that in a study from Bangladesh (10).

Although it was reported that almost everyone slept under a bed net, most used non-insecticide treated bed nets. It was reported that among the kala-azar cases nobody was sleeping under an insecticide-treated bed net; 42% of cases were using "Smoking" bed nets compared with 25% of the controls.

Further analyses are needed to clarify the associations between kala-azar and other types of non-treated bed nets, and whether people using "Smoking" bed nets are more likely than others to be involved with night-time activities. It is hoped to publish these results later.

The authors recommend increased distribution of treated bed nets and the expansion of kala-azar treatment centres in the county.

References

- Murthi H. Upsurge of kala-azar cases in Southern Sudan requires rapid response. WHO 2010 at http://www.who.int/leishmaniasis/Upsurge_kalaazar_Southern_Sudan.pdf
- Médecins Sans Frontières. Southern Sudan in grips of worst disease outbreak in eight years. http://www.doctorswithoutborders.org/press/release.cfm?id=4924&cat=press-release_2010
- Desjeux P. (1992). Human leishmaniasis: epidemiology and Public health aspects. *Wrlld Hlth Stat Q.* 45; 267-75
- WHO. 2002. Available at www.who.int/tdroid/diseases/leish/diseaseinfo.htm
- Agrawal S, Rai M and Sundar S. Management of visceral

Table 4. Bivariate analysis for environmental factors

Variables	OR	(95%C.I.)	P-value
Keep sleeping on damp/wet floor	1.30	(0.64-2.64)	0.47
Cracks inside or outside sleeping house	1.20	(0.61-2.51)	0.55
Sleeping house less than 100m from the river/stagnant water source	1.34	(0.67-2.69)	0.41
House near an anthill	1.89	(0.94-3.80)	0.07
House near <i>Acacia seyal</i> (Seb or Luor)	0.84	(0.41-1.72)	0.63
House near <i>Balanites aegyptiaca</i> (Thaou)	1.90	(0.93-3.88)	0.08
House near <i>Azadiracta indica</i> (Neem)	0.72	(0.35-1.52)	0.39
Occasionally play in the dark in the forest or around houses	2.36	(1.16-4.80)	0.02

TREATMENT OF KALA-AZAR

The official guideline adopted by the Ministry of Health is:

1. Sodium stibogluconate (20mg/kg)/day and paromomycin (15 mg/kg)/day for 17 days
2. Sodium stibogluconate 20mg/kg/day for 30 days
3. Liposomal amphotericin 3-5mg/kg/day infusion for over 6-10 days up to a total of 30mg/kg
4. Amphotericin B deoxycholate 0.75-1 mg/kg/day by infusion daily or on alternate days for 15-20 doses
5. Miltefosine orally at 2.5 mg/kg/day for 28 days

NB: The first three are the medicines currently in use in South Sudan.

Table 5. Multiple logistic regression analysis

Environmental variables	OR	(95% C.I.)	P- value
<i>B. aegypti</i> in the compound	1.90	0.93-3.88	0.08
Ant hills near home	1.88	0.94-3.80	3.80
Often spends time in night time activities (traditional dances and children games)	2.59	(1.20-5.57)	0.01

leishmaniasis: Indian perspective. *J Post grad Med.* 2005 51; 53-57

6. Boelaert M, Criel B, Leeuwenburg J, Damme van W, Le Ray D and Van der Stuyft P. *Visceral leishmaniasis control: A public health perspective.* *Trans R Soc Trop Med Hyg.* 2000. 94; 465-471
7. Osman OF, Kager PA and Oskam L. *Leishmaniasis in the Sudan: a literature review with emphasis on clinical aspects.* *Am J Trop Med Hyg.* 2000. 18; 1091-1210
8. Quate LW. Phlebotomus sandflies of the Paloich Area in the Sudan (Diptera, Psychodidae). *J Med Entomol.* 1964 1; 213-268
9. Minter DM, Wijers DJB, Heisch RB and Manson-Bahr PEC. Phlebotomus martini, a probable vector of kala-azar in Kenya. *Br Med J.* 1962. 2; 835
10. Caryn B, Allen WH et al, Risk Factors for Kala-azar in Bangladesh. *Emerg Infect Dis* 2005 May. Available



Figure 4. Types of bed nets in use (Smoking on left and Dhamoria on right).

at <http://www.cdc.gov/ncidod/EID/vol11no05/04-0718.htm>

Further reading

- Kolaczinski J, Hope A, Rumunu J, Richer M, Ruiz JA & Seaman J. Kala-azar Epidemiology and Control, Southern Sudan. *Emerging Infectious Diseases* 2008. 14: 664-666. http://www.malariaconsortium.org/pages/ntd_resources.htm

All photographs by John Lagu

SUDAN MEDICAL COUNCIL STARTS WORK IN JUBA

The Sudan Medical Council, Southern Sudan branch has opened in Juba and is temporarily housed at the Ministry of Health, Ministerial Complex Juba. Therefore all medical and allied health professionals delivering health services in Southern Sudan are required to be registered and to legalise their practices with immediate effect. The health professionals include Specialists, Consultants, Doctors, Medical Assistants, Clinical Officers, Dentists, Dental Technicians, Nurses, Midwives, Pharmacists, Laboratory Technologists, Technicians, etc.

For more information and conditions of eligibility for registration, see the notice board at the Medical Council office at the Ministry of Health, Juba or email: ssmedicalcouncil@gmail.com. More information may be found on the SSMJ website.

SSMJ would like to thank the authors of articles and everyone else who helped to prepare this issue including Charles Bakheit, John Adwok, Stanley Mwase and Ruth Parent.

Malaria in South Sudan 4: treatment of uncomplicated *P. Falciparum* malaria

Robert Azairwe^a and Jane Achan^b

In the February 2011 issue of SSMJ we covered the pathophysiology, and clinical and laboratory diagnosis of malaria (1, 2, 3). In this article we deal with the treatment of uncomplicated malaria. Management of malaria among pregnant women and children, and treatment of severe malaria will be published in future issues of this journal.

Uncomplicated malaria is “symptomatic malaria without signs of severity or evidence (clinical or laboratory) of vital organ dysfunction”. Cure is defined as “the elimination from the body of the parasites that caused the illness. This prevents progression to severe disease, and additional morbidity associated with treatment failure (4)”.

The primary aim of treatment is to cure the infection as rapidly as possible so it does not deteriorate into severe malaria. The public health (or secondary) aim is to reduce transmission to others and prevent the emergence and spread of resistance to anti-malarial medicines.

Anti-malarial drugs

Anti-malarial drugs can be classified by their action on different stages of the malaria parasite:

1. Tissue schizonticide (primaquine)
2. Blood schizonticide (chloroquine, sulphadoxine-pyrimethamine, quinine, mefloquine and artemisinins)
3. Gametocytocide (artemisinins and primaquine).

Anti-malarial combination treatments

Anti-malarial combination treatments are the simultaneous use of two or more blood schizonticidal drugs with independent modes of action and unrelated biochemical targets in the parasites (i.e. the partner drugs in a combination must be independently effective). They are recommended by World Health Organization (WHO) because they have the potential to:

- delay the development of resistance to the individual anti-malarials in the combination
- improve treatment outcomes

- overcome the threat of resistance of plasmodium falciparum to monotherapies.

Artemisinin derivatives should be one of the drugs in a combination.

Artemisinin based combination therapies (ACTs)

ACT is a combination therapy where one of the components is artemisinin or its derivative (artesunate, artemotil, artemether, dihydroartemisinin). Artemisinin derivatives are rapidly acting schizonticidal drugs capable of reducing parasite biomass by a factor of 104 each asexual life cycle. Another advantage of artemisinin derivatives is their ability to kill gametocytes, hence interrupting malaria transmission.

To eliminate at least 90% of the parasitaemia, a 3-day course of the artemisinin is needed to cover up to three post-treatment asexual cycles of the parasite. This leaves a much smaller number of parasites (10%) for the partner drug to kill while its concentration in plasma remains high.

ACTs recommended by WHO are:

- Artesunate + amodiaquine
- Artemether + lumefantrine
- Artesunate + mefloquine
- Artesunate + sulfadoxine-pyrimethamine
- Dihydroartemisinin + piperaquine

For the treatment of uncomplicated malaria in South Sudan:

- The recommended first line medicine is Artesunate/Amodiaquine.
- The recommended second line medicine is Artemether/Lumefantrine (Coartem®)

ACTs are available as:

- Two medicines contained in one tablet i.e. they are fixed-dose artemisinin based combination treatments.
- Separate medicines packaged together (co-packaged or co-blistered). However, the public ACT supply has shifted from co-blistered to co-formulated or Fixed Dose Combination of ASAQ.

a MD, MSc. Tropical Disease Control, Senior Technical Advisor, Management Sciences for Health, NMCP MOH, Southern Sudan
RAzairwe@msh.org

b MD. Lecturer, Dept Pediatrics and Child Health, Makerere University College of Health Sciences, Kampala achanj@yahoo.co.uk

Table 1. Artesunate Amodiaquine Fixed Dose Combination (Winthrop®)

Age	Infant 2 months – 11 months	Toddler 1 – 5 yrs	Child 6yrs – 13 yrs	Adolescent/Adult ≥14 yrs
Weight	>4.5 – <9 kg	>9 – <18 kg	>18– <36 kg	Over 36 kg
Tablet	25mgAS/67.5mgAQ	50mgAS/135mgAQ	100mgAS/270mgAQ	100mgAS/270mgAQ
Day 1	1 tablet	1 tablet	1 tablet	2 tablet
Day 2	1 tablet	1 tablet	1 tablet	2 tablet
Day 3	1 tablet	1 tablet	1 tablet	2 tablet

the dose should be repeated and the patient should receive a replacement dose from the health worker.

The presence of malaria parasites should be confirmed in all suspected cases. If there is no means of confirmation (RDT or microscopy) or if

the tests are negative, but the clinician (after history and physical exam and other investigations) is still convinced that malaria is the cause of illness, the patient should be given a full course of treatment with follow up 24-48 hours later.

Treatment regimes

The WHO recommended treatment for treating uncomplicated *P. falciparum* malaria in non-pregnant adults is to give an artemisinin based combination therapy (ACT) for at least 3 days. The regimes for the anti-malarials recommended in South Sudan are (5, 6):

First line: Artesunate + amodiaquine

The total recommended treatment is 4 mg/kg body weight of Artesunate (AS) and 10 mg base/kg body weight of Amodiaquine (AQ) given once a day for 3 days. (Table 1)

The tablets for each age group have different strengths, so they cannot be interchanged, combined or broken down as this can lead to overdosing or under dosing a patient.

Patients must finish all 3 days of treatment. Always give the first dose of the treatment in the clinic and observe the patient swallowing the medicine.

Second line: Artemether+lumefantrine

Patients must finish all 3 days of treatment. (Table 2) Always give the first dose of the treatment in the clinic and observe the patient swallowing the medicine. Explain that this ACT should be taken with food or fluids (fatty meals or milk) to improve its absorption, particularly on the second and third days of treatment. If vomiting occurs within half an hour of swallowing the medicine,

Treatment failures

Causes

Recurrence of *P. falciparum* malaria can result from re-infection or treatment failure - although it may be difficult to know the cause. Treat it as treatment failure if fever and parasitaemia have not resolved or recur within two weeks of treatment. Treatment failures may result from:

- drug resistance
- poor adherence or inadequate drug exposure (e.g. due to under-dosing, vomiting) or
- substandard medicines.

Find out if the patient vomited the previous treatment or did not complete a full course of treatment. If possible, confirm treatment failure by examining a blood slide.

In many cases, failures are missed because patients who present with malaria are not asked whether they have received anti-malarial treatment within the preceding 1–2 weeks. This should be a routine question in patients who present with malaria.

Table 2. Dosage of Coartem® tablets (Artemether 20mg & Lumefantrine 120mg)

Weight kg	Age	Day 1	Day 2	Day 3	Colour code of package
5 - 14 kg	From 4 months to 3 years	1 tablet 12 hourly	1 tablet 12 hourly	1 tablet 12 hourly	Yellow
15 - 24 kg	From 3 years to 7 years	2 tablets 12 hourly	2 tablets 12 hourly	2 tablets 12 hourly	Blue
25 - 34 kg	From 7 years to 12 years	3 tablets 12 hourly	3 tablets 12 hourly	3 tablets 12 hourly	Brown
>35	From 12 years and above	4 tablets 12 hourly	4 tablets 12 hourly	4 tablets 12 hourly	Green

PREGNANT WOMEN AND YOUNG INFANTS

Pregnant women should not take Artesunate/Amodiaquine or Artemether/Lumefantrine in the first trimester. Artemether/Lumefantrine is contraindicated for children below 5kg body weight. Such patients should be treated with oral Quinine (at a dose of 10mg/kg). In very young infants it is important to exclude other causes of fever.

Management

- Treatment failure within 14 days of receiving an ACT is unusual, but if it occurs treat with a 2nd-line antimalarial (i.e. Artemether /Lumefantrine).
- Treatment failure after 14 days of initial treatment should be considered as a new infection and treated with the first-line ACT (i.e. Artesunate/Amodiaquine).

Other aspects of management

Incorrect approaches to treatment

Do not:

- use artemisinins as monotherapy as this promotes resistance.

Patients who cannot take oral medicine

Some patients need parenteral or rectal administration for 1–2 days until they can swallow and retain oral medication reliably. Although such patients may never show other signs of severity, they should receive the same initial anti-malarial dose regimens as for severe malaria followed by a full 3-day course of ACT.

Antipyretics

Fever is a key sign of malaria and is associated with tiredness, weakness, headache, anorexia and often nausea. Treat with antipyretics and, if necessary, fanning and tepid sponging. Antipyretics should be used if core temperatures $\geq 38.5^{\circ}\text{C}$.

Paracetamol (acetaminophen) 15 mg/kg every 4 hours given orally or as a suppository is safe and usually well tolerated. Do not give acetylsalicylic acid (aspirin) to children because of the risks of Reye's syndrome.

Antiemetics

Vomiting is common in acute malaria and may be severe. It is not known if antiemetics are effective but there is no evidence that they are harmful, though they can mask severe malaria. Patients that vomit everything, including anti-malarials, should be managed as severe malaria.

Health education

Public education should be given at health facilities and schools, and by pharmacists and anyone prescribing and dispensing anti-malarials. This can:

- improve the understanding of malaria
- improved adherence to full treatment
- minimize the use of inappropriate anti-malarials.
- promote the use of malaria prevention tools especially insecticide-treated bed nets (ITNs).

HIV infection

Worsening HIV-related immunosuppression may lead to more severe manifestations of malaria. In stable endemic areas, HIV-infected patients with partial immunity to malaria may suffer more frequent and higher density infections. It is recommended that:

- patients with HIV infection who develop malaria should receive prompt, effective anti-malarial treatment regimens as recommended in the relevant sections of the WHO guidelines (1).
- intermittent preventive treatment with sulfadoxine-pyrimethamine should not be given to HIV-infected patients receiving cotrimoxazole (trimethoprim plus sulfamethoxazole) prophylaxis.
- treatment in HIV-infected patients on zidovudine or efavirenz should, if possible, avoid amodiaquine-containing ACT regimens.
- the use of malaria prevention tools like insecticide-treated bed nets should also be promoted in HIV-infected individuals.

References

1. Cornelio C.O. & Seriano F. Malaria in South Sudan: 1. Introduction and pathophysiology *SSMJ*. 2011. 1(1):7-9
2. Attwood D. Malaria in South Sudan: 2. Clinical features and diagnosis *SSMJ*. 2011. 1(1):10-12
3. Cornelio C.O. Malaria in South Sudan: 3. Laboratory diagnosis *SSMJ*. 2011. 1(1):13-16
4. WHO Guidelines for the treatment of malaria. Second edition 2010
5. Ministry of Health GOSS. Guidelines for management of malaria in Southern Sudan 2008
6. Ministry of Health GOSS. Southern Sudan introduces Fixed-dose Artesunate Amodiaquine. Malaria Control Department.

Note: This article is based on the powerpoint presentation 'Drug treatment of malaria' by Jane Achan

Preventing malaria during pregnancy: factors determining the use of insecticide-treated bed-nets and intermittent preventive therapy in Juba

Robert P. Napoleon^a, Amwayi S. Anyangu^b, Jared Omolacan^c and Juliet R. Ongus^d

Abstract

The study was carried out among 334 pregnant and newly delivered women seen at Juba Teaching Hospital in 2009. The objective was to assess the coverage of insecticide-treated bed-nets (ITN) and Intermittent Preventive Therapy (IPT) among these women and the factors associated with their use. Overall 87% of the women used ITN and 61% used IPT. ITN use was positively associated with buying nets, indoor spraying of insecticide and higher household income. IPT use was positively associated with more frequent antenatal clinic visits, indoor spraying and buying ITN.

Introduction

Studies show that malaria infections are higher in first and second pregnancies than subsequent ones (1). In South Sudan, as in other places, malaria is a cause of:

- maternal anaemia
- intra-uterine growth retardation
- low birth weight
- stillbirths and abortions, and
- maternal mortality (2, 3)

The World Health Organization (WHO) recommends IPT in pregnancy after studies showed that it reduced the prevalence of maternal anaemia and low birth weight (4, 5). The drug acts by clearing malaria parasites from the placenta during the period of rapid foetal growth (6).

To date there is no documentation on the coverage and determinants of the use of ITN or IPT in pregnancy in South Sudan. So the objective of this study was to fill this information gap.

Methods

A cross-sectional study was carried out between September and November 2009 at Juba Teaching Hospital (JTH). The Cochran formula ($z^2 \times p(1-p)/d^2$) was used to estimate the minimum sample size assuming the proportion of pregnant women using ITN (or IPT) was 33% (8, 1), a 95% confidence interval and a precision of 5%.

a MBBS, MSc. Directorate of Preventive Medicine, Ministry of Health, Government of Southern Sudan,
patmokili@yahoo.com, patmokili@gmail.com

b MBChB, MSc. Field Epidemiology and Laboratory Training Programme (FELTP), Kenya amwayi2004@yahoo.com

c MBBS, MSc. Field Epidemiology and Laboratory Training Programme (FELTP), Kenya. jaredom2000@yahoo.com

d MSc, PhD. Institute of Tropical Medicine and Infectious Diseases (ITROMID), Jomo Kenyatta University of Agriculture and Technology, Kenya. julietteongus@yahoo.co.uk

The participants were pregnant women attending the ante-natal clinic (ANC) in their second and third trimesters and women in the maternity ward in the immediate period after delivery. Every sixth woman meeting the inclusion criteria and giving her consent was selected. A total of 334 women were recruited – 167 from ANC and 167 from the ward. Data were collected on:

- use of ITN and IPT during pregnancy
- attitudes towards IPT
- how bed-nets were acquired
- ANC attendance
- indoor spraying of insecticide
- general knowledge and attitudes about the cause and prevention of malaria
- age, employment, education, monthly household income and parity.

Statistical Analysis

Epi Info version 3.4.3 statistical software was used for data entry and analysis. A descriptive statistical analysis was carried out on the use of ITN. Differences in proportions were analyzed using Chi square tests or Fisher exact test where appropriate. During bivariate analysis for factors associated with ITN and IPT use the measure of association was Odds Ratio (OR). A P-value ≤ 0.05 was considered a statistically significant association.

Factors that were significant during bivariate analysis ($P \leq 0.05$) were used as independent variables in the unconditional multiple logistic regression where a backward stepwise elimination method was used to obtain the final model. During the backward stepwise methods all the significant factors were entered in the model and the regression run until only factors that were significant (at $P \leq 0.05$) were retained in the model which was the final “best” model. This allowed for the assessment of

Ministry of Health guidelines for reducing malaria during pregnancy.

In accordance with WHO recommendations, the guidelines for reducing malaria during pregnancy in South Sudan are:

- treat clinical malaria
- promote the use of insecticide-treated bed-nets and
- prescribe Intermittent Preventive Therapy. Give at least two doses of sulfadoxine-pyrimethamine (SP) tablets at one month intervals, beginning after quickening in the second trimester. Give at least three doses to HIV infected women (7).

SSMJ plans to have an article on malaria in pregnancy in a future issue.

measures of association among nested levels of the factors retained in the model.

Results

Socio-demographic characteristics of participants (for full details see Table 1 in the Annex in the version of this article published on the SSMJ website)

The majority of women were in the 18-31 year age group (the mean age was 24 (± 5.4) years); most were unemployed or housewives (74%) and Christian (79%). Two thirds had attained primary or secondary education while 27% had not gone to school. The monthly income of the husbands of more than half of the women was between 500-1000 Sudanese pounds (approximately US\$185-370).

The overall use of ITN was 87% ($n = 296$; 95% CI = 85% - 92%) and of IPT was 61% ($n = 204$; 95% CI = 56% - 63%). The use of ITN and IPT was highest among women who:

- were aged 32 years and above
- were formally employed
- had attained secondary school education
- had a monthly household income above 1,000 Sudanese Pounds.

There was no significant difference in use of ITN and IPT among Christians and Muslims.

Factors associated with ITN use (for full details see Table 2 in the Annex in the version of this article published on the SSMJ website)

Bivariate analyses for factors associated with ITN use showed that the following factors were statistically significant at $P \leq 0.05$: buying ITN; being on the third or more ANC visit; household monthly income of \leq US\$ 100; use of indoor spraying to prevent mosquito bites; no education; doing nothing to prevent mosquito bites; Christianity; awareness that mosquitoes cause malaria and use of IPT.

These factors were used to obtain the final “best

fit model” and only three of these were independently associated with ITN use in pregnancy in the study. Those who had bought ITNs and those who used residual indoor spraying were more likely to sleep under insecticide treated nets. However women with low incomes were found to be less likely to use bed-nets.

Factors associated with IPT use (for full details see Table 3 in the Annex in the version of this article published on the SSMJ website)

Bivariate analyses for factors associated with IPT use showed that the following factors were statistically significant at $P \leq 0.05$: buying ITN; being on the third or more ANC visit; a household monthly income of \leq US \$100; use of indoor spraying for preventing mosquito bites, no education and starting ANC at above six months gestation.

Again, from the final best fit model only three factors were found to be independently associated with IPT use, namely, the buying of ITN, use of indoor spraying, and having attended three or more ANC visits.

Discussion

Eighty seven percent of women reported using ITN. This is almost twice that reported in Tanzania (9) and surpassed the target for the Abuja Declaration which set a target of 60% ITN coverage. Although this indicates that the target has been reached only one facility was covered in this study and more studies need to be done. Sixty one percent of women used IPT.

The highest proportion of both ITN and IPT users were in the 32-38 year-old group. Women who were formally employed and who were better educated had higher IPT and ITN use than women in the informal sector or with poorer education. This might be because the formally employed women have regular incomes and were more able to buy IPT. Those with a higher household income also had high IPT use. Formally employed women are likely to be better educated and hence know more about preventing malaria. Women with secondary education, or whose husbands had a university education, were also higher users of IPT.

The factors independently associated with both IPT and ITN use were:

1. Buying ITN.

These findings are in line with those from Kenya (10) and Congo Brazzaville (11) where it was shown that the poorest households had poorer access to the tools for preventing malaria than richer ones. A low income was negatively associated with ITN use.

2. Use of indoor spraying.

Visiting ANC three or more times was associated with increased IPT use. This indicated that the more the women go for ANC, the more knowledge they acquire and the more likely they are to receive IPT.

Recommendations

- The Ministry of Health should undertake further studies to find out whether the Abuja targets have been achieved in other health facilities.
- There should be rigorous public health education on the use of ITNs in addition to subsidizing ITNs or giving them out for free.
- The Ministry of Health should undertake rigorous awareness campaigns to educate mothers on the importance of regular ANC visits and IPT use targeting especially those with lower incomes or less education.
- There should also be further studies on the use of IPT in pregnancy to assess their impact since their introduction into the government's health policy.

Acknowledgements

We thank the following people for their support: Donna Jones, Dr Joe Oundo, Ahmed Abade, Dr Atem Nathan Riak, Dr Majok Yak Majok, Dr John Rumunu, Dr Munir Christo, Dr Olivia Lomoro, Dr Merghani Abdallah, Jemelia Sake and Remo James. Our sincere gratitude goes to the Juba Teaching Hospital staff and study participants.

The study was approved by the Ethical Board of the Directorate of Research, Planning and Health Systems Development in the Ministry of Health in the Government of Southern Sudan.

References

1. Brabin B. An Assessment of Low-Birth-Weight Risk in Primiparae as an Indicator of Malaria Control in Pregnancy. *Int J Epidemiol*; 1991. 20:276-283.
2. Adam I., Khamis A.H. and Elbashir M.I. Prevalence and risk factors for anaemia in pregnant women of Eastern

Sudan. *Trans R Soc Trop Med Hyg.* 2005; 90:739-43

3. Dafallah S.E., EL-Agib F.H. and Bushra G.O. Maternal mortality in a teaching hospital in Sudan. *Saudi Med J* 2003; 24:369-73.
4. Shulman C.E., Dorman E.K., Cutts F., Kawuondo K., Bulmer J.N., Peshu N. and Marsh K. Intermittent sulphadoxine-pyrimethamine to prevent severe anaemia secondary to malaria in pregnancy: a randomised placebo-controlled trial. *Lancet* 1999; 353: 632-636.
5. Newman R.D., Moran A.C., Kayentao K., Kayentao K., Benga-De E., Yameogo M., Gaye O., Faye O., Lo Y., Moreira P.M., Doumbo O., Parise M.E. and Steketee R.W. Prevention of malaria during pregnancy in West Africa: policy change and the power of sub- regional action. *Trop Med Int Health* 2006; 11: 462-469.
6. WHO/AFRO. A strategic framework for malaria prevention and control during pregnancy in the African region. AFR/MAL/04/01 2004
7. Malaria Control Strategic Plan, Draft Proposal, Ministry of Health Government of Southern Sudan, April 2006
8. Pettifor A., Taylor E., Nku D., Duvall S., Tabala M., Meshnick S. and Behets F. Bed net ownership, use and perceptions among women seeking antenatal care in Kinshasa, Democratic Republic of the Congo (DRC): Opportunities for improved maternal and child health. *BMC Public Health*, 2008; 8:331
9. Marchant T., Schellenberg J.A., Edgar T., Nathan R., Abdulla S., Mukasa O., Mponda H. and Lengeler, C. Socially marketed insecticide-treated nets improve malaria and anaemia in pregnancy in southern Tanzania. *Trop Med Int Health*. 2002; 7 no 2 pp 149±158
10. Guyatt, H.L., Corlett, S.K., Robinson, T.P., Ochola S.A. and Snow R.W. (2002). Malaria prevention in highland Kenya: indoor residual house-spraying vs. insecticide-treated bednets. *Trop Med Int Health* 2002; 7: 298-303.
11. Carme B., Plassart H., Senga P. and Nzingoula S. Cerebral malaria in African children: Socioeconomic risk factors in Brazzaville, Congo. *Am J Trop Med Hyg.* 1994; 50: 131-6

Further reading

- Gutman J. & Slutsker L. Malaria control in pregnancy: still a long way to go *The Lancet Infectious Diseases* March 2011 11 (3):157 - 159 (doi:10.1016/S1473-3099(10)70311-X).
- van Eijk A-M. et al Coverage of malaria protection in pregnant women in sub-Saharan Africa: a synthesis and analysis of national survey data *The Lancet Infectious Diseases* March 2011 11 (3) 190 - 207 (doi:10.1016/S1473-3099(10)70295-4).

Trauma, a new cause of death, disability and economic loss in Juba

Dario Kuron Lado^a

Introduction

Five years ago we were seeing an increasing number of trauma cases in Juba Teaching Hospital and the situation is even worse today in 2011. The objectives of this study were to:

- determine the magnitude and type of trauma injury as seen in Juba
- examine its causes
- explore possible solutions

Patients and methods

A prospective hospital-based study of all trauma patients was carried out for a period of eight months between January and August 2006. We excluded those brought in dead. Data used included admission and continuation notes.

Results

We saw 652 patients with different patterns of injury. Of these 58% (378) were males and 42% (274) were females. 12% (78) of the patients died, mostly as the result of severe head injury. The average hospital stay was 6 weeks.

Figure 1 shows that road traffic accidents (RTA) were the commonest cause of injury (391 cases) followed by gun shot injuries (157 cases). Domestic violence was the cause in 65 cases while other causes, such as falls from

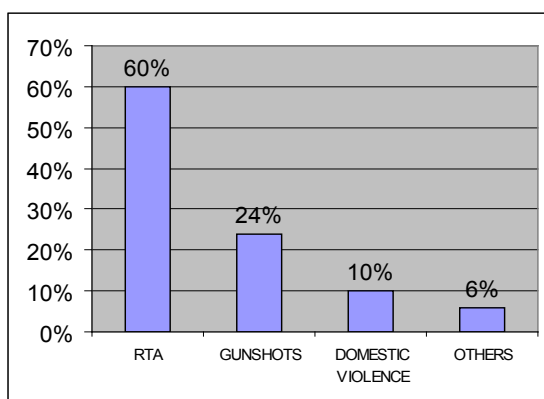


Figure 1. Causes of trauma among survey subjects.



Figure 2. X-ray of right forearm showing comminuted fracture due to gunshot (open fracture).

trees and accidental falls of elderly people, collectively accounted for 39 cases.

The causes of the RTA were:

- dangerous driving for 90% (352) of cases.
- drunkenness, bad roads and other factors for the remaining 10% (39 cases).

Figure 4 shows that of these 391 RTA patients:

- 60% (235) had long bones fractures (tibia, fibula, femur, humerus, forearm bones)
- 12% (47) suffered head injury
- 6% (23) had multiple ribs fracture
- 2% (8) had a spinal fracture
- 8% (31) had a pelvic fracture
- 12% (47) had a fracture of the short bones of hands and feet (see Figure 5.)

A later study in Juba of trauma caused only by motorcycle accidents found that injuries to the head accounted for about a fifth, and those to the lower limb about two thirds, of all injuries among drivers (1).

Discussion

Hope returned to the people of South Sudan when the peace agreement was signed in January 2005. The hope was that the end of the war meant no more lost lives and that people could prepare for new challenges. As is clear from this study, one of these challenges is that trauma is now a cause of much death, disability and economic loss.

^a MB BS, FS SMSB. Consultant Surgeon, Juba Teaching Hospital
kuron.lado@yahoo.com

This problem, though not expected by many, is the natural result of an increasing population, increasing number of cars and entire change in the life style of people in Juba. So that still today there are many more young men who are bedridden in surgical wards than at any time before the peace.

Road traffic accidents

The leading cause of trauma in this study was road traffic accidents caused mainly by reckless driving – and the situation is even worse today. Roads in Juba have been rehabilitated but this has not reduced the number of RTA due to other factors. One reason is that there many more cars and motor and push bikes, and drivers and cyclists still need to dodge deep potholes in the roads.

Last October the government held a Road Safety Awareness Week. We hope that stakeholders will implement and reinforce these safety awareness measures and so speed up the process of making the public aware of RTA challenges (2).

Other causes

The second most frequent cause of trauma was gunshots injuries - a reflection of the postwar widespread possession of guns and the need for conflict resolution campaigns by government and NGOs. Building trust among tribes will reduce intertribal conflicts. Civilians who feel their security is guaranteed are more likely to surrender their guns to the police and army - thus reducing the possibility of guns being used in any village conflict.

Urban life is hard for the internally displaced people in South Sudan as the majority is used to simple village life. Frustration and hopelessness arising from dislocation has increased domestic violence, which is almost unknown in rural life. So, providing the basic services of education, health and food security by the government and a commitment to improve the socioeconomic status of people is likely to reduce crime and domestic violence.

Treating trauma

The high burden of trauma injury is still taxing the



Figure 3. Open fracture of the distal end of the left femur due to gunshot

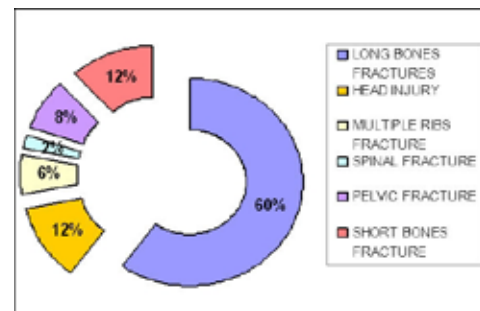


Figure 4. Nature of injuries caused by RTA.

resources of Juba Teaching Hospital so heavily that the capacity of the hospital to care for non-trauma patients has been reduced. Four of the six surgical wards are now filled by trauma victims. At the moment patients with long bone fractures are treated with skeletal traction and require a hospital stay of about 6 weeks as there are no facilities for open reduction and internal fixation.

Conclusion and recommendations

Trauma is a major medical problem in Juba and we need to urgently address its causes and management.

Causes of trauma

We recommend that:

- Awareness campaigns for road safety measures, like the one in 2010, should be followed up by the Ministries of Health in Central Equatoria State and Government of South Sudan in collaboration with the traffic police.
- Speed limits should be set for driving in the town and those exceeding the limits should be severely punished.
- The laws regarding the use of safety belts in cars, helmets on motorbikes and driving under the influence of alcohol should be enforced (3,4).
- All the roads within Juba should continue to be rehabilitated by the Ministry of Transport and Roads.
- Possession of firearms by civilians should be discouraged to prevent their use in village conflicts and crime.

Managing trauma

- The trauma management capacity of Juba Teaching Hospital needs strengthening.
- A trauma centre should be established in Juba as a referral point for all trauma patients who need special care.



Figure 5. Compound fracture of the right wrist joint following RTA. See exposed carpal bones.

- There are no rehabilitation services for those who survive trauma with serious physical and/or cognitive disabilities. We recommend the development of a multidisciplinary team of physiotherapists, occupational therapists and clinical psychologists as part of the overall management of trauma.

References

1. Allan, A. Motorcycle-related trauma in South Sudan: A cross sectional observational study. *SSMJ* 2009; 2(4):7-9
2. GOSS Ministry of Transport and Roads. Road Safety Awareness Week. October-November 2010.
3. Editorial: Helmets reduce death and brain injury in motorcycle and pushbike accidents *SSMJ* 2010; 3(4):68
4. Atem N, Lagu J, Christo M, Kur L. The cyclists helmet study in Juba, Southern Sudan, 2006. *SSMJ* 2010 3(4):69-71

Further reading

- Howard AW. Road Traffic Injury in Africa: Implications to Surgeons Surgery in Africa Monthly Reviews February 2011 <http://www.ptolemy.ca/members/current/Road%20Traffic%20Injury/index.html>

Acknowledgements

I thank Dr A. Joseph of the ICRC for discussing with me trauma management and how to cope with the stress, and my house officers for their keenness in caring for trauma patients. I am indebted to Edith Nagy for helping with computer work.

CASE STUDY - INTRACRANIAL HAEMORRHAGE

Clinical History

Hospital admission after sudden onset of severe headache, photophobia and neck stiffness with subsequent fall and loss of consciousness.

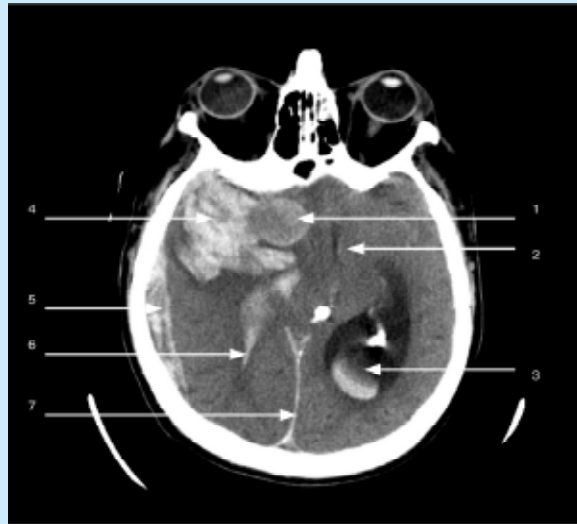


Figure 1. CT scan without iv-contrast obtained at admission about 1 hour post onset of symptoms.

1. Ruptured giant aneurysm of the right sided middle cerebral artery
2. Third ventricle showing signs of compression and left sided midline shift
3. Intraventricular haemorrhage involving the dilated posterior horn of left lateral ventricle
4. Intraparenchymal haemorrhage within the right temporal lobe and basal ganglia
5. Right temporal acute subdural haematoma
6. Intraventricular haemorrhage involving the posterior horn of right lateral ventricle
7. Subarachnoid blood collection within the posterior interhemispheric fissure

Radiological Report

There is evidence of a large right temporal intraparenchymal haemorrhage showing extent into right sided basal ganglia as well as frontoparietal white matter. The haemorrhage appears to originate from a large ruptured aneurysm of the right sided middle cerebral artery. Further blood collections are seen within the posterior horns of both lateral ventricles as well as fourth ventricle. A subtle subarachnoid blood collection is seen within the posterior interhemispheric fissure. There is also evidence of an extensive perifocal oedema resulting subsequently in a left sided midline shift or cerebral transtentorial herniation. The right lateral and third ventricle are markedly displaced and compressed resulting in a secondary obstruction of the left sided foramen of Monro subsequently leading to an internal hydrocephalus of the left lateral ventricle. Haemorrhage, perifocal oedema and internal hydrocephalus are resulting in an overall increase of intracranial pressure with subsequent cerebral transtentorial herniation and brain stem compression.

Contributed by Dr med. Stephan Voigt, Consultant Radiologist, St. Mary's Hospital, Isle of Wight, UK. stephan.voigt@iom.nhs.uk

Snapshot of South Sudan around 2009 - How much have things changed?

The following material is reproduced with permission from "Situation Analysis of Nutrition in Southern Sudan: Analysis Based on June 2009 Assessment" by Mija-tesse Ververs for the Food and Nutrition Technical Assistance II Project (FANTA-2). See Table 1 page 6 "Selected Population Statistics in Southern Sudan" for full details and references. To download the report, go to http://www.fantaproject.org/downloads/pdfs/SoSu_Situation_Analysis_Dec2010.pdf

Demographics

- About 8.3 million people lived in Southern Sudan in 2008 (48 percent female, 52 percent male).
- 20 percent of household members are children under 5 years.
- 72 percent of the population is under age 30.
- The average household size is about 7.4 people.
- The average household size of returnees is smaller, 4.5 people.

Poverty

- More than 90 percent of the population lives on less than US\$1 per day.
- Food Insecurity
- Between 1.3 million and 1.9 million people, or 16–23 percent of the population, have been food-insecure every year since 2005.

Maternal Health

- The maternal mortality ratio (MMR) is 2,054 per 100,000 live births.
- One of seven women who become pregnant will die due to pregnancy-related causes.
- On average, only 10 percent of the women deliver their babies with skilled health staff.
- The case fatality rate of women delivering in health facilities is 11,062 per 100,000 live births.
- The total fertility rate is 6.7 children.
- Less than 2 percent of women use modern contraception.

Child Health

- The infant mortality rate (IMR) is 102 per 1,000 live births.
- The under-5 mortality rate (U5MR) is 135 per 1,000 live births.
- About 20 percent of infants under 6 months are breastfed exclusively.

- About 55 percent of children 6–9 months receive timely complementary feeding.

Immunisation

- 17 percent of children are fully vaccinated.
- 28 percent of children receive measles vaccination before their first birthday.

Malaria

- Malaria is considered hyper-endemic, accounting for more than 40 percent of all health facility visits.

HIV

- In 2007, HIV prevalence was estimated at 3.1 percent, but is increasing.
- Less than 10 percent of women aged 15–49 know about HIV prevention.

Water and Sanitation

- 1 percent of the population has access to improved drinking water.
- 6.4 percent of the population uses improved sanitation facilities.
- About 40 percent of children under 5 had diarrhoea in the 2 weeks before their caregivers were surveyed.

Education

- Less than 50 percent of children receive 5 years of primary school education.
- In 2006, 55 percent of primary school-age children attended school.
- 1.9 percent of the population complete primary school education.
- There is one teacher for every 1,000 primary school students.
- 15 percent of adults are literate.

Gender

- 8 percent of women are literate, and 16 percent of young women (age 15–24) are literate.
- 36% percent of girls age 7–9 attend primary school.
- A 15-year-old girl has a higher chance of dying in childbirth than completing school.
- 18 percent of women 15–49 years were first married or in a union by age 15.

A new link is born . . . between Winchester and Yei

On 7th November 2010 a group of clinicians set off from the Royal Hampshire County Hospital, Winchester, UK on a fact-finding visit to Yei in Southern Sudan. The purpose of this visit was to review healthcare there, specifically secondary care at Yei Civil Hospital, and to assess whether a 'Link' between Winchester and Eastleigh Healthcare NHS Trust (WEHCT) and Yei Civil Hospital would be mutually beneficial.

From the outset, Poppy and John Spens from the Martha Primary Health Care Centre in Yei liaised extensively with hospital staff and as a result of this WEHCT was directly invited by senior doctors to visit. The aim was to identify areas of healthcare in Yei where WEHCT may be able to help in the future and to build links with the local community. Initial thoughts were that the main focus should be on areas of greatest need, namely maternity and paediatrics. However, we would be guided by the wishes of local clinicians.

The team for this first visit to Yei consisted of senior midwife Nancy MacKeith, microbiologist Kordo Saeed, anaesthetist Gary Dickinson and paediatrician Simon Struthers. In Yei the team met the Minister of Health for Central Equatoria, Dr Emmanuel Ija Baya, the Minister for Social Development for Central Equatoria, Miss Helen Murshali and the two local Doctors, Dr James and Dr Simbe. Throughout the trip the team was welcomed by members of the local government, religious and community leaders, local health professionals and hospital staff, all of whom made it abundantly clear that the project had their full support.

The team spent most of their time in Yei studying every aspect of the hospital including the facilities, equipment, structure, site and general care. They talked with staff of all types and, because they stayed in hospital accommodation, they also chatted informally with staff based in the area.

Results of the trip

The main problems discovered were:

- morale
- motivation
- resource – staffing, drugs, equipment (mainly diagnostics such as working ultrasound machines or laboratory incubators), facilities, basic hospital infrastructure (e.g. availability of water and hand washing facilities)
- lack of specific expertise
- lack of training structure and continuous professional development of the current staff.



The Winchester and Yei teams at the end of a successful initial visit

The focus of this first visit was not to look at general health needs of a population or where funds could be allocated. Its purpose was to allow professionals from one hospital to review how this hospital might help and be helped by another.

Since returning to UK, the Winchester-based members of the Link have liaised extensively with colleagues in Yei and with interested parties in the UK, including two other local hospital trusts in Poole and the Isle of Wight. Both of these have established Links with hospitals in Wau and Juba, respectively. All three NHS organisations agree that opportunities exist, especially around training and development, to collaborate on joint initiatives with our partners in South Sudan and this is something we will be working towards in the near future.

In addition, useful discussions about the Winchester-Yei Link and the idea of joint working with other local Links and their partners were held with the Minister of Health for Southern Sudan, Dr Luka Tombekana Monoja, during his visit to UK in December. We are now working with staff at the hospital in Yei to determine priorities for future activities. In the meantime, we have provided a new maternity bed - the first of a number of small projects that we hope to undertake before the next visit to Yei, planned for this September.

Contributed by Denise Yelverton denise_yelverton@yahoo.co.uk

Bor medical camp

Moses Gak Rech^a

In November 2010 I took part in a 7-day Regional Medical Camp in Bor town, South Sudan. This was the 4th medical camp organized by the University of Calgary as part of the SSHARE (Southern Sudan Healthcare Accessibility, Rehabilitation and Education) Project – see Box.

As those of us working in South Sudan know, our country has some of the highest child and maternal mortality rates in the world. So it was particularly useful that in this Camp we focused on Maternal and Child Health.

Our guest instructors were Dr John Arraf and Dr Lanice Jones from the University of Calgary, and Dr

Martin Maring (obstetrics/gynaecology) and Dr Louis Danga (paediatrician) from the Juba Teaching Hospital. Those attending included nine of us in the Sudanese Physician Reintegration Program as well as medical colleagues from Bor State Hospital (see Figure 1). We spent the mornings at the hospital doing paediatric rounds, surgery, and out-patient clinics. During the afternoons we were in the classroom with hands-on teaching and seminars. Among the most useful skills we learnt were: basic ultrasound skills, comprehensive care of paediatric patients and antenatal care (see Figures 2 and 3).

^a a Doctor of Medicine from High Institute of Medical Sciences of Havana, Cuba. Currently Medical Officer, Kurmuk Hospital, Southern Blue Nile State, Sudan.



Figure 1. Members of the group at the Camp.



Figure 2. Drs Louis Danga and Moses Rech doing a paediatric round at Bor Hospital.



Figure 3. Dr Martin Maring teaching Ultrasound skills

SSHARE: Southern Sudan Healthcare Accessibility, Rehabilitation and Education Project

<http://www.ucalgary.ca/uci/development/sshare>

In the mid-1980s I was one of the 600 hundred South Sudanese refugee children from Etang refugee camp in Ethiopia who were sent to Cuba. Here a group of us trained as physicians. Due to the changing political climate in Cuba and the war in Sudan, we were unable to go home. We were resettled in Canada, but remained determined to return to South Sudan to serve as doctors. However we had never practiced medicine so our medical skills needed to be upgraded and adapted to the conditions in South Sudan.

For this reason the Sudanese Physician Reintegration Program was set up consisting of a 9-month academic medical upgrading programme at the University of Calgary and a subsequent 12-month Residency Training in various mission hospitals in Kenya. Continuing Medical Education is being provided by medical camps in South Sudan, workshops, seminars and long-distance learning opportunities, and provision of medical education resources.

All of us in this programme are now working in hospitals and clinics throughout Jongelei, Central Equatoria, Upper Nile and Blue Nile States.

The SSHARE project is managed by the University of Calgary, Canada with support from CIDA and in partnership with Samaritan's Purse Canada.

News and Resources

In this issue these are listed under:

- HIV and other infections
- Nutrition
- Surgery
- Medicine/Other conditions
- Continuing medical education/learning materials

HIV and other infections

WHO Policy Briefs to Combat Antimicrobial Resistance

Healthcare workers are at the frontline of the emergence of drug resistance. They work in hospitals or other healthcare settings where patients who frequently receive antimicrobial medicine are more likely to develop and spread resistant infections. To mark World Health Day on 7 April 2011 WHO published a set of Policy Briefs on this issue. Brief 4 'Regulate and promote rational use of medicines, including in animal husbandry, and ensure proper patient care' points out that:

- Only 50% of people with malaria receive the recommended first-line anti-malarial medicine.
- Only 50-70% of people with pneumonia are treated with appropriate antibiotics.
- Up to 60% of people with viral upper respiratory tract infection receive antibiotics inappropriately.

Among the recommended 20 Core Actions are:

- Develop standard treatment guidelines in collaboration with professional societies, medical and paramedical teaching institutions; regularly update and promote the use of the guidelines; and encourage inclusion of the guidelines in basic medical and paramedical curricula...
- Provide independent and unbiased information about medicines for health personnel and for consumers as a function of the ministry of health, with dedicated budgets for this purpose.
- Educate prescribers on factors which may influence their prescribing habits.
- Introduce regulations which address all aspects of the promotion of pharmaceuticals; ensure that advertisements contain only information that was approved when the product was registered.'

See all the Briefs at: [http://www.who.int/world-health-](http://www.who.int/world-health-day/2011/policybriefs/en/index.html)

[day/2011/policybriefs/en/index.html](http://www.who.int/world-health-day/2011/policybriefs/en/index.html)

[From www.hifa2015.org/child2015-forum 9 April 2011]

Acute and chronic kidney disease and HIV

This detailed article published by HATiP Newsletter #172 looks at the causes and prevalence of acute and chronic kidney disease in people with HIV in sub-Saharan Africa.

See <http://www.aidsmap.com/page/1633148/>

HATiP is a regular electronic newsletter for healthcare workers and community-based organisations on HIV treatment in resource-limited settings. For further information see www.aidsmap.com/hatip

Cotrimoxazole prophylaxis for HIV-positive infants aids growth, reduces anaemia

New findings from the Children with Antibiotic Prophylaxis (CHAP) trial show that the daily use of cotrimoxazole in untreated HIV-infected infants significantly improved growth and reduced anaemia.

Reference: Prendergast A et al. Improved growth and anemia in HIV-infected children taking cotrimoxazole prophylaxis. *Clin Infect Dis* 52 (7):953-956, 2011. Download a summary at <http://www.aidsmap.com/page/1757255>

NAM AIDSMAP

This site provides resources on HIV/AIDS at <http://www.aidsmap.com/resources>. These include one-page factsheets, providing a summary of over 100 topics which can be printed and shared. See <http://www.aidsmap.com/factsheets>

Nutrition

Field Exchange: the Emergency Nutrition Network magazine

This is a free hard-copy magazine published three times a year containing field articles, research and news pieces for those working in emergency nutrition and food security. You can download and order hard copies at <http://www.enonline.net/fex>

Nutrition Modules for emergency/crisis situations

The Harmonised Training Package documents key nutrition areas in emergencies and protracted crisis situations and is for trainers, practitioners and decision makers. It is organised as a set of modules by subject, each containing technical information, training exercises

and a resource list for use in training course development covering: Introduction and concepts (5 modules); Nutrition needs assessment and analysis,

Interventions to prevent and treat malnutrition, and Monitoring, evaluation and accountability.

You can download all the modules at http://www.unscn.org/en/gnc_http

Surgery

Surgical Care at the District Hospital is a toolkit developed by WHO. The package includes a manual, training videos, and best practice protocols. The aim is to provide guidance on developing policy, training curricula, essential equipment, teaching and best practices on trauma, anaesthesia, HIV prevention, pregnancy complications and in disaster situations. The toolkit takes a primary health care approach in strengthening health systems to reducing death and disability in injury, pregnancy related complications, congenital anomalies and infection. It is available on a priced CD but all items, other than the videos, can be downloaded from <http://www.who.int/surgery>.

Surgery in Africa Monthly Reviews

These reviews are available free at www.ptolemy.ca/members

Examples of recent ones in 2010-11 are:

- August: Disorders of the Umbilicus
- September: Evidence Based Medicine for the Surgeon
- November: Evidence Based Medicine (Updated)
- December: Groin Hernia Repair-Revisited
- January: Hirschsprung's Disease in Africa in the 21st Century

February: Road Traffic Injury in Africa: Implications to Surgeons

March: Treatment of Neglected Clubfoot

Also at this site are archives of reviews since 2005 and a resource library.

Medicine/Other conditions

Guidelines for the prevention and clinical management of snakebite in Africa: 2010.

World Health Organization, Regional Office for Africa, Brazzaville. Download from http://www.afro.who.int/index.php?option=com_docman&task=doc_download&gid=5529

Continuing medical education/learning materials

The Cochrane Library's database of health-related Systematic Reviews

This database of systematic reviews and meta-analyses summarises and interprets the results of medical research. It is a valuable resource that is available free to readers in South Sudan (and other low-income countries). It is easy to access, does not require user-name or password and easy to search. Abstracts and 'Plain Language Summaries' are available to readers everywhere. Find the Library at <http://www.thecochranelibrary.com/view/0/index.html>.

Makerere University, Uganda: Scholarly Digital Library

The Digital Library aims promote local research. Students and researchers are encouraged to submit all pre-prints of their research articles as well as their theses and dissertations related to health research about Uganda. The Library contains many documents relevant to medicine in South Sudan.

To use the Digital Library go to <http://dspace.mak.ac.ug/community-list>. Then click on the link to the College of Health Sciences and you can search by subject, author etc. The Library provided full text articles and full dissertations/theses.

[Reproduced with permission from an email to HIFA2015 from Alison Kinengyere, Serials librarian at the Makerere University College of Health Sciences.]

Self-help Learning Courses for nurses

EBW (Electric Book Works) Healthcare publishes appropriate, affordable and up-to-date self-learning material for healthcare workers in the fields of perinatal care, HIV, TB and maternal and child health.

You can buy the courses as books or browse the content at the website for free. Each course has a set of multiple-choice tests. See www.EBWhealthcare.com

[From CHIL2015 forum CHIL2015@dggroups.org]

African Journal of Health Professions Education (AJHPE)

This new bi-annual journal seeks to publish information relevant to the education of doctors, nurses, midlevel clinicians, and other health professionals. The second issue focuses on educating health professionals to meet Africa's needs and most articles can be downloaded for free from <http://www.ajhpe.org.za/index.php/ajhpe/issue/view/2/showToc>.

The Journal of Public Health in Africa (JPHiA)

This is a peer-reviewed, electronic quarterly journal that focuses on health issues in the African continent. The journal editors seek high quality original articles on public health related issues and reviews. The aim of the journal is to move public from the background to the forefront. The success of Africa's struggle against disease depends on public health approaches. See <http://www.publichealthinafrica.org/index.php/jphia>

African Networks for Health Research & Development (AFRO-NETS at www.afronets.org) is a website that aims to facilitate exchange of information among different networks in health research in Anglophone Africa particularly in the fields of capacity building, planning, and research.

To subscribe to received updates go to <http://list.healthnet.org/mailman/listinfo/afro-nets>

AuthorAID is a global research community that provides networking, mentoring, resources and training for researchers in developing countries – see <http://www.authoraid.info>. Its Resource Library has many useful downloadable documents. These include: Scientific Writing: Tips and Resources (Microsoft PowerPoint presentation).

African academics 'slow to use online journals'

Despite improved access to electronic online journals, academics and students are not taking advantage of them, according to a new study. Poor journal access was identified by academics as a barrier to their work in the past. However, not being able to get into electronic journals is not the only issue; lack of access and skills to work on computers and time and money constraints are also barriers. Libraries and academics need to partner regularly in order to learn from each other.

For the full report by Ochieng' Ogodo and Mercy Adhiambo see Science Development Network <http://bit.ly/hnha1m> [From procor Weekly Prevention Update 15 Dec 2010 www.procor.org]

[ly/hnha1m](http://bit.ly/hnha1m) [From procor Weekly Prevention Update 15 Dec 2010 www.procor.org]

Why Africa is short of doctors

A recent survey of the region's medical schools showed there is a critical shortage of doctors in sub-Saharan Africa. Reasons included: low number of graduates; high rate of immigration, faculty shortages, limited financial support, lack of co-ordination among government agencies and infrastructure problems. A key recruitment and retention element is missing from many medical schools - less than 10% of the region's medical faculty are involved with sponsored research.

[From Global Health Matters Newsletter. <http://bit.ly/gCa9CO>]

African innovation: New hope for local health issues

A series of papers from the McLaughlin-Rotman Centre for Global Health that review how countries and companies in sub-Saharan Africa are addressing health problems through local innovation (e.g. a low-cost portable fuel-free medical waste incinerator developed at Makerere University). All articles are open access. The papers highlight progress and barriers, as well as provide policy suggestions to strengthen local innovation. All papers are available on the website.

See McLaughlin-Rotman Centre for Global Health <http://bit.ly/geRa3j>

Meducation

This is a global community of medical professionals and students, supporting each other and helping each other to learn, through the sharing of information, resources and ideas. You can share and view videos, podcasts, slideshows, clinical images, practice exam questions and community based wiki notes all for free.

Go to www.meducation.net to sign up.

Situation Analysis of Nutrition in Southern Sudan

The report "Situation Analysis of Nutrition in Southern Sudan: Analysis Based on June 2009 Assessment" gives a useful and detailed overview of the nutrition situation in South Sudan, including its causes and the country's policies and plans for tackling malnutrition. It also summarises nutrition-related programmes and projects. You can request a hard copy of the report from Food and Nutrition Technical Assistance II Project fanta2@aed.org or download it at www.fantaproject.org/downloads/pdfs/SoSu_Situation_Analysis_Dec2010.pdf

Now on the SSMJ website

Interim Guidelines Integrated Management of Severe Acute Malnutrition 2009, Ministry of Health Government of Southern Sudan. This comprehensive 200-page document covers the all aspects of the modern management of acute malnutrition including community outreach, outpatient and inpatient care and monitoring and reporting.

Letter to the Editor**THE PLIGHT OF MEDICAL EDUCATION AT THE UNIVERSITY OF JUBA**

Dear Editor,

Juba University Medical Students Association (JUMSA) would like to bring into light the above mentioned subject through this reliable medical journal. Taking into consideration the fact that Southern universities are being relocated from the North to the South of Sudan, we have already experienced and will continue to see numerous problems facing medical education at the university level. Below highlighted issues are based on the experience of medical students of the University of Juba, but likely apply to the other Southern universities in Bahr el Ghazal and Malakal. They include the following:

1. Uncertainty of the academic year 2011 – 2012: The possibility of University of Juba, and indeed other Southern universities, opening for the mentioned academic year has become very unpredictable. The academic calendar has now been postponed twice from the usual calendar, and there remain no clear signs that we will start our education this year!
2. Infrastructure and accommodation inadequacy: This includes lecture halls and accommodation for both lecturers and students. Feeding for students this year is unpredictable too as the Sudan National Students' Welfare Fund program is expected to end. No viable alternative has been brought forward to this point.
3. Lecturers shortage: Given that most of the original lecturers in College of Medicine were Northerners who are NOT willing to relocate from Khartoum to Juba, we now experience a dearth of teachers aside from the few who have visited us in short stints from the US.
4. Poorly equipped hospital for the practice by clinical year classes: Juba Teaching Hospital currently has few consultants to instruct the current and rising clinical medical students. There seems to be no formal curriculum or structure to the teaching at the JTH.
5. Library and Laboratory: The College of Medicine has very few books given that the medical library in Khartoum has not yet been transferred to Juba. In addition, we hope to have a media library to keep us current with science. The Laboratory we have in Juba now lacks both space and equipment; we believe it is important and necessary to have a modern medical laboratory for adequate practice.

These points are just a summary of the many problems that the College currently faces. However, we would like to acknowledge the tremendous efforts of Prof. Thomas F. Burke, the Chief, Division of Global Health and Human Rights, Massachusetts General Hospital (MGH), and the South Sudan Medical Education Collaborative (SSMEC), who have been helping us a lot by sending us instructors from the US. We therefore would like to urge them and indeed the rest of the stakeholders both inside and outside of South Sudan to intensify their support towards medical education. As we march to independence with some of the worst health records world over, we recognize that our new country has incredible potential for growth, and we as medical students deeply desire to address these pressing health issues through improved training currently and improved practice in the future!

Thanks in advance.

John Mabor Kok and Leju Benjamin Modi

JUMSA 2010 – 2011

jumsajuba@gmail.com

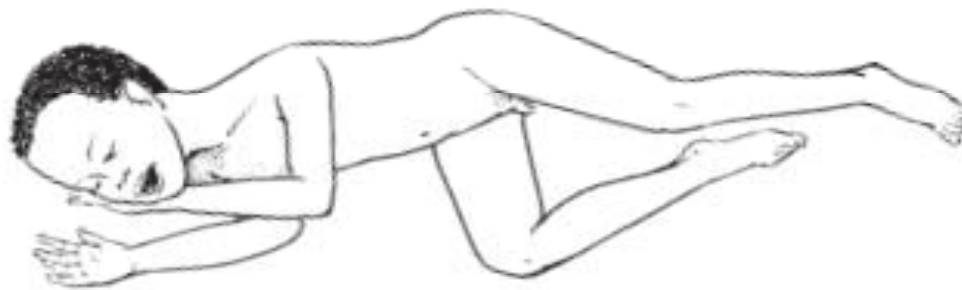
WHO CHARTS FOR EVERYONE CARING FOR CHILDREN IN HOSPITAL

Chart 6. How to position the unconscious child from 'Pocket Book of Hospital Care for Children - Guidelines for the Management of Common Illnesses with Limited Resources' WHO 2005. See the whole book at <http://www.ichrc.org/>. Charts 1 – 5 were reproduced in previous issues of this journal.

You can use these charts in different ways. For example, you can print them and display them in relevant wards or clinics (laminated if possible), or use them as a 'memory aid' in your pocket, as handouts or as training aids.

We thank the WHO for permission to reproduce these charts, and Dr O'Hare who gave us the idea of making the charts more widely available.

CHART 6. How to position the unconscious child



■ If neck trauma is not suspected:

- Turn the child on the side to reduce risk of aspiration.
- Keep the neck slightly extended and stabilize by placing cheek on one hand
- Bend one leg to stabilize the body position

■ If neck trauma is suspected:

- Stabilize the child's neck and keep the child lying on the back:
- Tape the child's forehead and chin to the sides of a firm board to secure this position
- Prevent the neck from moving by supporting the child's head (e.g. using litre bags of IV fluid on each side)
- If vomiting, turn on the side, keeping the head in line with the body.

